TITLE: Using the Donabedian framework to examine the quality and safety of nursing service innovation

CORRESPONDING AUTHOR:

Glenn Gardner RN PhD FRCNA
Professor of Clinical Nursing
School of Nursing, Institute of Health and Biomedical Innovation
Queensland University of Technology
Victoria Park Rd
Kelvin Grove, Queensland 4059
Australia
Phone: 61 7 3636 2140
Fax: 61 7 3636 5832
Email: ge.gardner@qut.edu.au

CO-AUTHORS

Anne Gardner RN PhD MRCNA
School of Nursing, Midwifery and Paramedicine Australian Catholic University
223 Antill Street Watson ACT 2602
PO Box 256 Dickson ACT 2602
T: +61 2 6209 1237 F: +61 2 6209
Email: anne-gardner@acu.edu.au

Jane O'Connell RN, NP, MACNP
School of Nursing, Institute of Health and Biomedical Innovation
Queensland University of Technology
Victoria Park Rd
Kelvin Grove, Queensland 4059
Australia
T: + 61 7 3138 1742 F: +61 7 3636 5832
Email: j1.oconnell@qut.edu.au

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Competing interests

No conflict of interest has been declared by the authors.

ABSTRACT

Aim: The study aim was to evaluate the safety and quality of nurse practitioner service using the audit framework of structure, process and outcome.

Background: Health service and workforce reform is on the agenda of governments and other service providers seeking to contain health care costs whilst providing safe and effective health care to communities. The nurse practitioner is one health workforce innovation that has been adopted globally to improve timely access to clinical care but there is scant literature reporting evaluation of the quality of this service innovation.

Design: A mixed methods design within the Donabedian evaluation framework was used

Methods: The Donabedian framework was used to evaluate the Structure, Process and Outcome (SPO) of nurse practitioner service. A range of data collection approaches was used including stakeholder survey (N=36), in-depth interviews (11 patients, 13 nurse practitioners) and health records data on service processes.

Results: The study identified that adequate and detailed preparation of Structure and Process is essential for successful implementation of a service innovation. The multidisciplinary team was accepting of the addition of nursing practitioner service and nurse practitioner clinical care was shown to be effective, satisfactory and safe from the perspective of the clinician stakeholders and patients.

Conclusions: This study demonstrated that the Donabedian framework of SPO evaluation is a valuable and validated approach to examine the safety and quality of a service innovation. Furthermore, in this study specific Structure elements were shown to influence the quality of service Processes further validating the framework and the interdependence of the SPO components.

Relevance to clinical practice: Understanding the structure and process requirements for establishing nursing service innovation lays the foundation for safe, effective and patient centred clinical care.

Key words: Audit, Health service innovation; Health services research; Nurse practitioner

INTRODUCTION

Health services are under pressure as the burden of disease and changing demographics of the health care consumer are stretching the capacity of systems to meet demand. A prominent response to these current pressures is development and adoption of innovative health service delivery models. The nurse practitioner is one of these reform models and has been adopted globally to improve timely access to clinical care for specific populations.

The International Council of Nurses states that the characteristics of nurse practitioner practice is "shaped by the context and/or country in which s/he is credentialed to practice"(International Council of Nurses Nurse Practitioner/Advanced Practice Nursing Network 2005). Common elements across all definitions of the role are that the nurse practitioner is educated at masters level, works from a nursing model of care and in many countries has legislative support to prescribe, refer and diagnose. These practice enhancements enable the nurse to complete an episode of care without the need to 'hand over' the patient at critical points in the care trajectory (Carryer *et al.* 2007, Gardner *et al.* 2006). This expansion of nursing practice is a timely and logical response to increasing demands on health services.

BACKGROUND

The speed with which the nurse practitioner service model has been adopted has outpaced attention to evaluation of safety and quality of clinical care. In Australia for example a national census of authorised nurse practitioner conducted in 2007 (Gardner *et al.* 2009) repeated in 2009 (Middleton *et al.* 2011) showed a two-fold increase in overall numbers in the three year period and in the state of Queensland, a five-fold increase. Nurse practitioner work includes diagnostic activities and intervention-based treatments, including use of medicines; these activities have traditionally been limited to the realm of medical practice. It is expected therefore that questions are raised about the

safety and effectiveness of nurse practitioner practice with the consequence that researchers have turned to studies comparing nurse practitioner with medical care (Arts *et al.* 2012, Dierick-van Daele *et al.* 2010, Horrocks *et al.* 2002, Mundinger *et al.* 2000). These comparative studies provide information and reassurance that nurse practitioner service is no less safe than the service of doctors. However this research approach has limited application as there is no evidence that medical practice is a benchmark of safety and quality of patient care (Caldwell 2010).

The safety and quality agenda has been adopted by health care systems internationally and is understood as the degree to which potential risk and unintended results are avoided or minimized in health care through continuous assessment of how well the organisation is performing in its goal to improve clinical care (Institute of Medicine 2001, Verma Ranjit 2012). Routine audit of clinical care is now a standard indicator of patient safety and quality in most health care organizations. There is indication in the literature that nurse practitioners are conducting clinical audits of practice using relevant indicators and guidelines as criterion standards and the outcome of these audits support the quality and safety of nurse practitioner care. However the nurse practitioner role is a reform model designed to improve access for under-serviced groups therefore evaluation of the safety and quality of the nurse practitioner as a service innovation calls for an approach that can accommodate the complexity of the multiple dimensions of a service improvement initiative. The Donabedian model (Donabedian 1966) provides an evaluation framework that supports systematic inquiry into health services. Donabedian's model of Structure, Process and Outcome (SPO) is a construct whereby each component is influenced by the previous, making the components interdependent (Donabedian 1966, Smitz Naranjo & Viswanatha Kaimal 2011). The purpose of this project was to conduct a comprehensive safety and quality audit of nurse practitioner service.

METHODS

We applied the Donebedian SPO model to evaluate safety and quality of nurse practitioner service. The nurse practitioner is both a clinical care model and a service innovation, accordingly, evaluation included a) the setting for nurse practitioner service (Structure); b) the clinical service provided by the nurse practitioner (Process) and c) the influence of nurse practitioner service on patients (Outcome). Data were collected analysed and reported related to these three elements guided by the following audit questions:

1. To what extent was the service/facility prepared to incorporate nurse practitioner service in terms of the multidisciplinary team and the organisation of the service structure
2. What impact does the nurse practitioner role have on service quality and processes including use of diagnostic resources, prescribing practices and perceived impact on service indicators
3. Does nurse practitioner practice meet standards of safety and quality of patient care in terms of perceptions of clinical competence, patient satisfaction with care, conformity to scope of practice and best evidence

Setting, Sample and Recruitment

The audit study was conducted in public health services in Queensland, Australia. The following groups were recruited to the study.

Nurse practitioners

Maximum variation sampling gained a sample of nurse practitioners that was geographically and clinically representative of services across the state. The sampling frame included:

- Diversity of nurse practitioner specialty fields
- Services from all health service jurisdictions that have nurse practitioners
- Nurse practitioners who have been working in the role for a minimum of 6 months

All nurse practitioners working in the Queensland public health system were invited to respond by email if they were interested in participating in the audit. From the list of respondents a sample of eleven nurse practitioners was selected using the sampling frame. Sample size was determined by the funding capacity and reporting timeframe.

Service Stakeholders

The stakeholders in this audit were medical, nursing and allied health clinicians working in or with the health services associated with the sample of nurse practitioners. All clinician stakeholders were recruited directly via internal mail with a package containing a letter of invitation, information and consent documents, a questionnaire and reply paid envelope.

Patients

For each nurse practitioner participant a convenience sample of two patients was selected and invited to participate in the study.

Data collection

Data collection was conducted by an appointed Auditor, an experienced nurse practitioner from interstate and therefore not a member of the Queensland nurse practitioner cohort. The audit used a multi-methods approach to data collection and data were used in combination to address each of the questions as follows.

1. A postal survey was distributed to members of the multidisciplinary teams (MDT). Consenting respondents completed and returned the questionnaire directly to the research team. Questionnaires were coded prior to distribution and linked to the individual nurse practitioner's service.

The Nurse Practitioner Stakeholder Questionnaire was adapted, with permission from the copyright holder (Drennan *et al.* 2009) and comprised three parts. Part 1 was a series of 27 items on evaluation of the nurse practitioner role. Each item had five possible responses ranging from *1*

strongly disagree - 5 *strongly agree*. Part 2 had two items relating to the respondent's professional group and the degree to which they worked with the nurse practitioner. A final section allowed for additional unstructured comments to be added.

2. In-depth interviews were conducted with nurse practitioners and patients. An interview guide was used for each group to ensure that standard data were collected across all services (see Table 1). The timeframe for each interview was between 30 to 60 minutes.

Table 1: Nurse Practitioner and Patient Interview Guides

Nurse Practitioner Interview Guide	Patient Interview Guide
Were you working at this health facility prior to becoming endorsed as a NP? Were you involved in the development of the NP role either at this site or elsewhere? Are supported in the NP role? By the institution By nursing By the multi-disciplinary health care team Are there organisational variables that constrain NP roles in your health setting? Are there organisational variables that facilitate NP roles in your health setting? What would you like to change to enhance the NP role? Do you have a strategy for audit of practice? *Specific questions related to their cases under review* Do you have adequate access to/time for professional development? Is the NP role valued, promoted and understood throughout the organisation? *Give examples*	Does the NP service meet your needs? Has the introduction of the NP reduced delays in you treatments Has the introduction of NP service made access to health care easier? Does the NP involve you in decision making about your care? Do you receive sufficient information regarding your condition and treatment from the NP? Do you feel safe with the NP? Does seeing the NP reduce the need for you to seek care as frequently as previously? Was the waiting time to see the NP acceptable to you? Do you feel confident in the care you receive/d from your NP? *give examples* Has the NP improved your experience of using this service? *give examples* What is your perception of the quality of NP care? Do you feel confident about the outcome of your visit to the NP? Do you feel confident to take care of your condition?

3. Patient health record audits used a previously tested data abstraction tool (Gardner *et al.* 2010) to collect standardised data from the records of all participating patients.

4. Peer Case Review of consenting patients was conducted for each nurse practitioner drawing upon all data sources. See Table 2 for Peer Case Review template. The management of patients' episodes of care was evaluated in accord with criteria from Australian National Nurse Practitioner

Competency Standards (Gardner *et al.* 2006). The Auditor reviewed the patients' health records, conducted on-site interviews with patients and followed this with interviews with the nurse practitioner.

Table 2: Case review template

NP Model Context: e.g. Chronic Disease			
Patient Health issue: R leg ulcer, obesity			
Assessment Criteria	**Auditor's Judgement**	↙ **Evidence exemplars** ↘ **Patient Health records**	**Patient Interviews**
1. Knowledge, skills & Performance (1, 2, 3) • Quality of pt assessment • Appropriate use of diagnostics • Clarity of clinical decision making • Appropriateness of treatment/interventions • Working within scope of practice ***2. Communication & Teamwork (5-7)*** • Pts experience of care • Pts' self care knowledge and competencies • MDT survey ***3. Quality & Safety (4, 8)*** • Pt's perception of • quality of care • Use of evidence to inform practice	*e.g. Against each criterion, Auditor reviewed evidence from patient interviews and health records against each of the assessment criteria and recorded a narrative judgement*	*e.g. Review of NP's clinical notes, relevance, quality completeness*	*e.g. Excerpt of patient interview relevant to each criterion*
NP's reflexion on Auditor's Judgement:			

Data analysis

Survey

Responses were analysed using SPSS Version 18. For Part 1 there were four missing values and these were randomly distributed with no respondent skipping more than one item. Missing values were imputed using the 'mean replacement' method, (Munro 2005) a conservative procedure that reduces variance but provides a more complete dataset for analysis. Descriptive statistics summarised quantitative data primarily with measures of central tendency and dispersion.

Responses to most items were normally distributed and so means and standard deviations have been reported. Two sub-scales were calculated from items in Part 1 – a communication and teamwork subscale (3 items) and a quality and safety sub-scale (17 items). Given the purposive, non-random sampling methods used, inferential statistics were not used.

Interviews

Interviews were audio recorded then transcribed into password- protected word files. The narrative data were coded within the analytical framework of Structure, Process and Outcome. Coding was conducted by two of the investigators and validated using a consensus approach. Within the SPO framework coded data from both nurse practitioner and patient interviews were then also assigned according to the assessment criteria for quality and safety of clinical care in the Case Reviews.

Health record audits

Data collected from patients' medical records were reviewed on a case by case basis for the Peer Case Review and also aggregated for overall frequency measures.

Ethics approval was gained from the service and university Human Research Ethics Committees. All participants gave informed consent to participate in the study.

RESULTS

The sample characteristics of the three participant groups are described. Then Audit evaluation results are reported using the Donabedian framework.

Sample characteristics

Nurse practitioner

The nurse practitioner service fields covered a variety of contexts including rural, regional and large metropolitan health care facilities. The service specialties included primary care, community-based chronic disease clinics and hospital acute care settings.

Patients

Across the 11 nurse practitioner service models 13 patients were ultimately recruited to the study. Of these nine were male and four female with an age range of 28 - 76.

Multidisciplinary teams

A total of 70 multidisciplinary team members from 11 nurse practitioner service areas were provided with a survey package. The overall response rate was 51% (n=36). The sample included nurses (n=17), medical practitioners (n=10) and allied health practitioners (n=8); one respondent did not state their professional group.

Question 1: Evaluation of Structure related to nurse practitioner service

This is about the extent to which the health facility was sufficiently ready to incorporate the nurse practitioner role into delivery of service. Evaluation of Structure drew upon data from the MDT survey and nurse practitioner interviews.

Perceptions of the multi-disciplinary team

Responses to evaluation of the nurse practitioner role were positive, with a total mean score of 4.02 (sd 0.62) indicting that 95% of responses overall were either ‘agree’ or ‘strongly agree’. The difference between highest and lowest mean ranked item was less than 2.5 points on the five point Likert scale. The highest ranked item was ‘The nurse practitioner in my area has a positive impact on patient care’ with two of the other five highest ranked items also relating to standards of patient

care. The total mean scores for both subscores were very similar with a total mean for the three item subscore 'communication and teamwork' of 4.10. Analysis of the differences between professional groups revealed the total mean scores were again very similar with the nursing group having the highest mean score (see Table 3) and allied health the lowest. Otherwise there was no discernible pattern to responses aside from the strongly positive perspective to most aspects of the role when all nurse practitioner roles were grouped together.

Table 3: Comparison of means for 'Communication and Teamwork' and 'Quality and Safety' across professional groups.

Professional Group	Communication and Teamwork m(sd)	Quality and Safety m(sd)	Total Score M(sd)
Nurses (n=17)	4.09 (0.94)	4.11 (0.62)	4.09 (0.62)
Medical Practitioner (n=8)	4.12 (0.31)	3.86 (0.48)	3.95 (0.43)
Allied Health (n=10)	4.13 (0.61)	3.82 (0.88)	3.87 (0.77)
All groups	4.10 (0.72)	3.98 (0.67)	4.02 (0.62)

Experience of the nurse practitioners

Team function: Results from nurse practitioner interviews showed the nurse practitioners perceived their role as a positive addition overall to the team and its impact on the service structure. Differences were obvious however when the interviewees discussed individual discipline groups. The nurse practitioner reports revealed that medical, pharmacist and allied health clinicians were accepting of the role with positive and productive working relationships. These groups reportedly understood the role and how it enhanced patients' access to timely care. Conversely radiographers were reported as resisting the inclusion of requesting X-Ray in the nurse practitioners' scope of practice. Furthermore, difficulty in team functioning for the nurse practitioners related to other nursing staff. Almost 50% of the nurse practitioners had negative experiences with their nursing colleagues. Expressions such as 'shocked' 'disappointed' 'saddened' and 'surprised' were common in the narratives. Conversely the nurse practitioner data also reported support and collegiality from nursing.

Service structure: The nurse practitioners reported that team support was important to integration of the role into the service. Perceptions of quality of support included acceptance or resistance of new work structures, succession planning and continuing education. The most salient finding in this area related to the need for more clarity around the work relationships between other advanced practice nurses and nurse practitioner roles. This was identified as problematic with no clear planning on how these roles would complement and enhance each other in clinical service. Some participants commented on "a battle for leadership".

Question 2: Evaluation of Process related to nurse practitioner practice

This involved scrutiny of the clinical practice of nurse practitioners including the use of resources, technical competence, evidence base for practice and conformity to the parameters of their scope of practice. Evaluation of process drew upon data from health records audit, MDT survey and nurse practitioner interviews. The interview data revealed that most of the nurse practitioners were fully conversant with, and reportedly worked from, national and international evidence based guidelines and frequently accessed journal literature to 'stay abreast' of evolving knowledge.

Use of resources Analysis of aggregated data from the health records of patients gives a snapshot of the way that these nurse practitioners are delivering clinical care. For the 13 patients reviewed there were over 150 face-to-face occasions of service within the audit timeframe of 18 months with the addition of multiple phone consultations with nine of these patients. Use of diagnostics over these occasions of service is presented in Table 4.

Table 4: NP use of diagnostics over 150 episodes of care

Investigation	Specific test	Conditions of diagnostic request
Bloods	Haematology	All blood diagnostics were routine test with clinic appointment.
	Biochemistry	
	Microbiology	
	Cytology	
	Serology	
X-Ray	Chest	Requested by NP
	Ultrasound	**Comments** These diagnostics were recommended by the NP for a doctor to action because these diagnostics were outside their scope of practice.
	Echocardiogram	
	Arterial/venous Doppler	
	CT pelvis/abdo	
	Bone scan	
	Wound swabs	**Comment** The wound swabs, MSU and sputum were performed by the NPs and processed through the hospitals where they worked.
	Sputum culture	
	MSU	
	Colonoscopy	The colonoscopy was a recommendation by the NP for the physician to action

All nurse practitioners used therapeutic interventions including procedural, counselling and educational intervention activities. There were 53 interventions with a range of 3-6 per nurse practitioner. There was documentation for every occasion of service with documentation of collaboration with MDT members in 12 patients' records.

Use of medications included new medicines prescribed for 9 patients with 7 patients having drug titration on multiple occasions. The data from medical records showed the nurse practitioners to be assiduous in recognition of the patients' primary care physician as the lead clinician with recommendations on medication change notified to the physicians for 7 patients, 4 of these on multiple occasions. Documentation showed that medication review by the nurse practitioner occurred on all occasions of service. Table 5 shows that the MDT agreed or strongly agreed that the nurse practitioner role is valuable in terms of meeting patient needs, improved access and reduced delay and service efficiencies.

Table 5: Selected (Process) Items

	Item	Total N=36 m(sd)
Q1.3	NP service meets the needs of the patients	4.16 (0.87)
Q1.10	The NP service is easy to access	4.05 (0.62)
Q1.18	The introduction of the NP has reduced delays in patient care	4.05 (0.86)
Q1.17R	NPs are necessary, patients cannot receive all their treatment from a doctor	4.03 (0.94)
Q1.22	The introduction of the NP has freed up doctors time	3.94 (1.04)

There is however less agreement on the value of the role in reducing duplication of service and multiple consultations across disciplines (Figure 1a & 1b).

Figure 1a Duplication of service

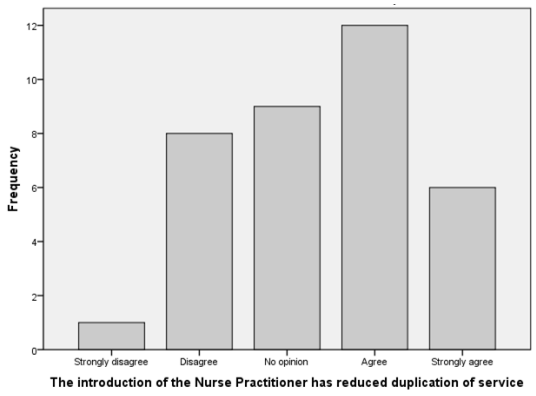

Figure 1b interaction with multiple clinicians

Question 3: **Evaluation of Outcomes related to nurse practitioner practice**

Evaluation of Outcome involves close examination of nurse practitioner service in terms of the impact of clinical care, patient satisfaction with care and safety of nurse practitioner practice. Evaluation of Outcome drew upon data from audit of patients' health records, patient interviews, and the 13 Case Reviews.

Review of health records of 13 patients' across six different service settings showed that nurse practitioner prescribing practice was conservative and judicious. Over the 18 month period that covered the episodes of care, the six nurse practitioners prescribed medicines for nine patients and

medication review was document on all occasions of service for all patients. The MDT survey demonstrated that medical and allied health colleagues of nurse practitioners are confident in the quality and safety of their prescribing and they disagreed or strongly disagreed that nurse practitioner prescribing was risky (see Figure 3). The mean score for the 'quality and safety' sub-scale was 3.98. Furthermore the MDT agreed or strongly agreed that nurse practitioners' care was safe (mean 4.19) and nurse practitioners diagnosed correctly (mean 4.05).

Patient satisfaction with nurse practitioner care

Patient satisfaction with health care or clinical service is usually evaluated using satisfaction surveys. In this audit, because of the nascent nature of nurse practitioner service in the study context, we conducted in-depth interviews to gain patients' own descriptions about their experience and level of satisfaction with nurse practitioner service. The patient interviews yielded 54 pages of narrative text providing a comprehensive insight into the experiences that consumers have in receiving care from nurse practitioners in Queensland.

A major outcome of health service is patient-centred care and this audit of patients' experiences illustrated that nurse practitioners met best practice standards in patient-centred care. The following patient narrative is one of many examples in this study of perceptions of quality of nurse practitioner health service.

> … she (NP) is able to answer other questions than probably only a doctor might be able to. So I find the position as a NP is a very important role. It's like a bridge between the nursing staff and the doctors. And sometimes a patient might feel intimidated by the doctors you know, but in her case you can talk to her, you can open up, she showed an interest in me which to a patient means a lot.

The data consistently reports that patients 'feel safe' and 'feel confident and safe' in the care of a nurse practitioner. As one patient commented when asked about their perception of the quality of care:

> Top class, I wouldn't have expected this because this is the public health care system and it's not private and gosh, wow, yes. What would have they been doing with the people in the private system if this is what you get in the public system, amazing.

Patients were coached in skills and knowledge by the nurse practitioner to achieve self care and a working knowledge about their condition. This calls upon advanced knowledge in biophysical science and skills in communication, coaching and education.

> My NP has given me treatment options and information and talked it through, I asked many questions. I am very organic, and I had a lot of hesitation about the medications. She talked me through and answered all of my questions. If she wasn't around I don't think that I would have had someone explaining that to me and probably I would have been googling on the internet or just trying to find my own information so the NP is ... well, I couldn't imagine doing this without her.

These narratives are a small sample from the extensive data from patient interviews. The patients' voice is clear; nurse practitioner service is highly valued and patients attest to the quality and safety of nurse practitioner care through their feelings of confidence, safety and satisfaction with this service.

Case review of nurse practitioner clinical care

For five of the nurse practitioner participants, recruitment of patients in the time frame of the study proved to be not unfeasible. Consequently, case reviews were conducted on the clinical care of 6 nurse practitioners across 13 patients; five nurse practitioners had 2 patient reviews and one had 3 patient reviews. The case reviews indicate that these nurse practitioners adequately met the competency standards with explicit examples provided against each of the performance indicators.

All evidence gathered supported the quality and safety of the service of this sample of nurse practitioners.

DISCUSSION

The introduction of a new health service provider is inherently risky. There can be caution and lack of trust from other health disciplines and factors other than the quality of clinical service can influence the new clinician's work practice. Donabedian, (Donabedian 1988) claimed that measuring quality of clinical care is neither precise nor complete and he cautioned health service managers to 'steer the middle ground' when interpreting the outcomes of these studies arguing that judgement about *Outcomes* should not be made without also considering *Structure* and *Process*. The audit findings supported the quality and safety of nurse practitioner service and clinical practice. However the audit also revealed areas where improvements are required in *Structure* and *Process* elements to achieve ongoing development in nurse practitioner service and to optimise clinical outcomes.

Analysis of Structure relates to contextual features that are needed to support successful implementation of a health service initiative; the physical, material, professional and collegial elements of clinical service. This audit showed that overall the multidisciplinary team was positive about working with nurse practitioners, supporting earlier work that found when other clinicians understand the role they are positive about the service (Griffin & Melby 2006, Weiland *et al.* 2010). Findings from a recent study indicated that doctors were more positive than nurses about the nurse practitioner role particularly in relation to clinical competence (Cheng & Chen 2008). This is consistent with the qualitative findings from this audit. Almost half of the nurse practitioner sample reported negative experiences with nursing colleagues, particularly nurses in senior clinical roles.

There is indication here that the role of the nurse practitioner is not fully understood. When understanding of the role was measured on a scale of 1 to 5, both nurses and doctors rated their

understanding lower than allied health staff (means of 3.88, 3.87 and 4.33 respectively). Furthermore there was reported confusion around role clarity between different advanced practice nursing roles. This role ambiguity is the topic of discussion in the international literature and is the basis of ongoing Australian research (Chang *et al.* 2010, Gardner *et al.* 2007). That role ambiguity influenced implementation of nurse practitioner service in this audit supports the international call (Brook & Rushforth 2011, Currie *et al.* 2007, Lowe *et al.* 2012) for clarity around advanced practice nursing roles and service models.

The results relating to role clarity signal a potential problem for health facilities in terms of implementing nurse practitioner service. It is clear that more consultation across all disciplines is necessary in the planning and implementation of the nurse practitioner role. This is supported in the literature (Considine & Fielding 2010). Furthermore, clarity is needed around the scope of practice and targeted engagement of this with diagnostic services. There is need to address role differentiation between nurse practitioners and other advanced practice nursing roles.

Evaluation of Process examines the provision of care, and process characteristics are considered to have the most influence on quality outcomes (Smitz Naranjo & Viswanatha Kaimal 2011). The nurse practitioner interviews indicated that most practise according to established evidence based clinical guidelines for patient care in their specialty. Furthermore, many of the nurse practitioner participants reportedly were involved in some form of regular review or audit of clinical practice. Audit of the patients' health records in this study showed that nurse practitioners were judicious in use of diagnostic resources and conservative in prescribing practices. The MDT agreed or strongly agreed that the nurse practitioner role is valuable in meeting patient and service needs.

Results indicated that an area in need for improvement was duplication of nurse practitioner care activities and the perceptions of the MDT were less positive on this *Process* issue. Previous writers (Smitz Naranjo & Viswanatha Kaimal 2011) claim that whilst *Process* elements have most influence on *Outcomes* they in turn rely on *Structure* attributes to be successful. This audit of a

service innovation validates and supports the Donobedian framework and Smitz Naranjo et al's interpretation of this framework. Nurse practitioners in Australia have legal authority to prescribe, refer and request diagnostics. However those who practice within a state government funded public health facility do not have provider status for their prescriptions, their referrals to medical specialists nor for diagnostic investigations that are activated outside the specific public health facility. This means that patients who have nurse practitioner prescriptions, referrals and diagnostic investigation requests are not eligible for Commonwealth Government subsidies. Hence the nurse practitioners in this Audit, and indeed in all state-funded public health facilities in Australia, need to garner the cooperation of a medical colleague to initiate these clinical functions for their patients. This was clearly perceived by medical clinicians as duplication of service. This anomaly is a *Structural* element that has a direct effect on the success of *Process* in nurse practitioner service.

Evaluation of Outcomes showed nurse practitioner clinical care to be effective, satisfactory and safe from the perspective of the MDT and patients. Patient satisfaction is particularly high and this is well support by other research (Agosta 2009, Allnutt *et al.* 2010). Case review of 13 patients was conducted by a clinically qualified Auditor. The findings from the reviews showed that nurse practitioners conduct comprehensive patient assessment, that clinical decision making is well supported by clinical and diagnostic information, that patient teaching and building self-care competencies are consistently provided and that practice is informed by evidence from specialty clinical guidelines and/or published research. There was no indication in patient interview data that duplication of service influenced satisfaction with nurse practitioner clinical care nor did it influence patients' satisfaction with health outcomes.

Limitations

As Donabedian, (Donabedian 1988) cautions, measuring quality of clinical care is neither precise nor complete. Whilst a larger sample of all participants may have revealed additional information about the safety and quality of nurse practitioner service in the study sites, the Donabedian

framework proved to be an appropriate audit methodology to investigate this new service provider. Our findings adequately validated the Donabedian framework and provided important baseline information for ongoing audit of nurse practitioner service in these sites.

CONCLUSIONS

Nurse practitioners are a new level of health care provider and the service is well established in most countries. However, evaluation of the role in terms of quality and safety of the service in a *Structure, Process, Outcome* framework has not to date been reported in the literature. This audit has demonstrated that implementing an innovative service intervention requires detailed preparation in the field of service.

Clarity around roles and responsibilities is essential for optimum functioning of the existing MDT. Detailed preparation and education with all clinicians on the scope of practice, service goals and internal collaborations is essential. Structural elements of the service and the goals of service reform need to be established and communicated. Not-with-standing the Structural and Process issues related to implementation of nurse practitioner service, in this study the clinical service was considered safe and effective. Furthermore patients were overwhelmingly positive about the clinical and interpersonal quality of nurse practitioner service.

The Donabedian framework provides a useful model to guide planning, preparation and evaluation of a health service innovation. This Audit has demonstrated that nurse practitioner services in this sample lacked the level of *Organisational* and *Proce*ss support required for effective implementation of a service innovation. It also demonstrated that nurse practitioner service was valued by patients, deemed safe and effective by the MDT and judged to meet all indicators of quality and safety by the expert Auditor.

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